



CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

An ISO 9001:2008 Certified Company

NABL - Accredited Laboratory as per ISO / IEC-17025 : 2005



Job No.: CTCE/BBMP/RSCN/WNo.07/WMM/S-T/2014-15

03.06.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Customer	Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
Agency	Mr. Ram Singh Chandra Naik, Contractor, Bangalore.
Name of Work	Improvements to roads, drains and asphaltting to roads in Venkategowda Layout Kempapura 3rd Main in Ward No. 7, Byatarayanapura, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/502/2013-14 Dated: 24.02.2014
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	03.06.2014



Result : Flakiness Index = 11.69%

Elongation Index = 13.75%

Result : Combined Flakiness & Elongation index 25.44%

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

Note:

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QUALITY CONTROL REPORTS FOR
SEMI DENSE BITUMINOUS CONCRETE



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Job No.: CTCE/BBMP/RSCN/WNo.07/QB(SDBC)/2014-15

16.06.2014

TEST REPORT ON DETERMINATION OF BITUMEN CHARACTERISTICS

CLIENT	:	Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
AGENCY	:	Mr. Ram Singh Chandra Naik, Contractor, Bangalore.
NAME OF THE WORK	:	Improvements to roads, drains and asphaltting to roads in Venkategowda Layout Kempapura 3rd Main in Ward No. 7, Byatarayanapura, BBMP, Bangalore.
REFERENCE	:	EE/BTP/BBMP/E-PMT/502/2013-14 Dated: 24.02.2014
SAMPLE ID	:	Bitumen
DATE OF TESTING	:	16.06.2014



The results of the tests conducted on the bitumen sample.

Sl. No	Description	Test Method as per IS	Test Result	Requirement as per IS:73:2013
1	Penetration at 25 °C, 1/10 mm	IS :1203 -1978 (RA-2009)	85	80 to 100
2	Softening point, °C	IS :1205 -1978 (RA-2009)	48	Min. 40
3	Ductility at 27°C, cm	IS :1208 -1978 (RA-2009)	100 >	Min. 75
4	Flash Point, °C	IS :1209 -1978 (RA-2009)	292	Min. 220



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Job No.: CTCE/BBMP/RSCN/WNo.07/SDBC/AIV/2014-15

16.06.2014

Aggregate Impact Value

IS: 2386 Part IV

Client	Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
Agency	Mr. Ram Singh Chandra Naik, Contractor, Bangalore.
Name of the Work	Improvements to roads, drains and asphaltting to roads in Venkategowda Layout Kempapura 3rd Main in Ward No. 7, Byatarayanapura, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/502/2013-14 Dated: 24.02.2014
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	16.06.2014



Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	377	379	21.03
2	Weight of aggregate passing 2.36 mm sieve after the test = W_2 g	78	81	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	299	298	
4	Aggregate Impact value = percent fines $100 * (W_2/W_1) \%$	20.69	21.37	



Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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16.06.2014

Aggregate Impact Value

IS: 2386 Part IV

Client	Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
Agency	Mr. Ram Singh Chandra Naik, Contractor, Bangalore.
Name of the Work	Improvements to roads, drains and asphaltting to roads in Venkategowda Layout Kempapura 3rd Main in Ward No. 7, Byatarayanapura, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/502/2013-14 Dated: 24.02.2014
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	16.06.2014



Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	379	382	21.55
2	Weight of aggregate passing 2.36 mm sieve after the test = W_2 g	80	84	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	299	298	
4	Aggregate Impact value = percent fines $100 * (W_2/W_1) \%$	21.11	21.99	

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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16.06.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
Agency	Mr. Ram Singh Chandra Naik, Contractor, Bangalore.
Name of Work	Improvements to roads, drains and asphaltting to roads in Venkategowda Layout Kempapura 3rd Main in Ward No. 7, Byatarayanapura, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/502/2013-14 Dated: 24.02.2014
Technical Reference	IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	16.06.2014



Result : Flakiness Index = **11.36%**

Elongation Index = **13.52%**

Result : Combined Flakiness & Elongation index

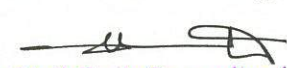
24.88%

Comments:

→ Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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16.06.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
Agency	Mr. Ram Singh Chandra Naik, Contractor, Bangalore.
Name of Work	Improvements to roads, drains and asphaltting to roads in Venkategowda Layout Kempapura 3rd Main in Ward No. 7, Byatarayanapura, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/502/2013-14 Dated: 24.02.2014
Technical Reference	IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	16.06.2014



Result : Flakiness Index = **11.59%**

Elongation Index = **13.71%**

Result : Combined Flakiness & Elongation index

25.30%

Comments:

→ Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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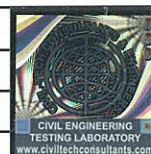
Job No.: CTCE/BBMP/RSCN/WNo.07/SDBC/Stripping/2014-15

19.06.2014

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Client	Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
Agency	Mr. Ram Singh Chandra Naik, Contractor, Bangalore.
Name of the work	Improvements to roads, drains and asphaltting to roads in Venkategowda Layout Kempapura 3rd Main in Ward No. 7, Byatarayanapura, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/502/2013-14 Dated: 24.02.2014
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	19.06.2014



Type of binder : 80/100
Percentage of binder used : 5.0% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.0 g
Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	2.6	2.77	97.23
2	2.8		
3	2.9		



Comments:

→ Minimum allowable Aggregate retained coating for Semi Dense Bituminous Concrete is 95%

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Job No.: CTCE/BBMP/RSCN/WNo.07/Sp_Wa/2014-15

19.06.2014

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Client	Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
Agency	Mr. Ram Singh Chandra Naik, Contractor, Bangalore.
Name of the Work	Improvements to roads, drains and asphaltting to roads in Venkategowda Layout Kempapura 3rd Main in Ward No. 7, Byatarayanapura, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/502/2013-14 Dated: 24.02.2014
Type of Mix	Semi Dense Bituminous Concrete
Source / Location	Hotmix Plant, Bangalore
Date of Testing	19.06.2014



Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	$W_1 g$	2013	2015	2015	
2	Weight of basket suspended in water	$W_2 g$	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s g$	1258	1260	1260	
4	Weight of saturated surface dry aggregate in air	$W_3 g$	2007	2011	2014	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_s) g$	749	751	754	
6	Weight of oven dried aggregate	$W_4 g$	1995	1998	1999	
7	Specific Gravity	$W_4 / (W_3 - W_s)$	2.664	2.660	2.651	2.658
8	Apparent Specific gravity	$W_4 / (W_4 - W_s)$	2.707	2.707	2.705	2.706
9	Water Absorption	$((W_3 - W_4) * 100) / W_4$	0.60%	0.65%	0.75%	0.67%

Comments:

→ Maximum allowable Aggregate Water absorption value for Semi Dense Bituminous Concrete is 2.0%

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Job No.: CTCE/BBMP/RSCN/WNo.07/SDBC/Bitumen/2014-15

19.06.2014

BITUMEN CONTENT DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

AS per IRC : SP : 11 - 1984

CLIENT	Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
AGENCY	Mr. Ram Singh Chandra Naik, Contractor, Bangalore.
NAME OF THE WORK	Improvements to roads, drains and asphaltting to roads in Venkategowda Layout Kempapura 3rd Main in Ward No. 7, Byatarayanapura, BBMP, Bangalore.
REFERENCE	EE/BTP/BBMP/E-PMT/502/2013-14 Dated: 24.02.2014
SAMPLE I/D	3rd Main Kempapura Venkategowda, Ward No. 7
DATE OF TESTING	19.06.2014



BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	474	475
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	26.00	25.00
7. Bitumen content in %	5.20	5.00
8. Average	5.10	

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19.06.2014

BITUMEN GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

As per IS : 2386 and IRC : SP : 11 - 1984

CLIENT	Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
AGENCY	Mr. Ram Singh Chandra Naik, Contractor, Bangalore.
NAME OF THE WORK	Improvements to roads, drains and asphaltting to roads in Venkategowda Layout Kempapura 3rd Main in Ward No. 7, Byatarayanapura, BBMP, Bangalore.
REFERENCE	EE/BTP/BBMP/E-PMT/502/2013-14 Dated: 24.02.2014
SAMPLE I/D	3rd Main Kempapura Venkategowda, Ward No. 7
DATE OF TESTING	19.06.2014



GRADATION AFTER EXTRACTION

Sieve Size in mm	Trail 1				Specified Limits as per MORTH specification table 500-15 (Grading-2)
	Weight Retained, gm	% Retained	%Cumulative Retained	% Passing	
13.2	0	0	0	100	100
9.5	26.35	5.56	5.56	94.44	90-100
4.75	257.48	54.32	59.88	40.12	35-51
2.36	62.38	13.16	73.04	26.96	24-39
1.18	46.12	9.73	82.77	17.23	15-30
0.3	27.95	5.90	88.67	11.33	9-19
0.075	31.02	6.54	95.21	4.79	3-8

Sieve Size in mm	Trail 2				Specified Limits as per MORTH specification table 500-15 (Grading-2)
	Weight Retained, gm	% Retained	%Cumulative Retained	% Passing	
13.2	0	0	0	100	100
9.5	28.15	5.93	5.93	94.07	90-100
4.75	265.49	55.89	61.82	38.18	35-51
2.36	55.32	11.65	73.47	26.53	24-39
1.18	32.69	6.88	80.35	19.65	15-30
0.3	28.15	5.93	86.27	13.73	9-19
0.075	35.64	7.50	93.78	6.22	3-8

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19.06.2014

Aggregate Gradation Test

IS : 2386 Part I

Client	Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
Agency	Mr. Ram Singh Chandra Naik, Contractor, Bangalore.
Name of the Work	Improvements to roads, drains and asphaltting to roads in Venkategowda Layout Kempapura 3rd Main in Ward No. 7, Byatarayanapura, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/502/2013-14 Dated: 24.02.2014
Sample I / D	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete (SDBC)
Date of Testing	19.06.2014



Total Weight of Sample: **5600** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
13.2	0	0.0	0	100	100	Gradation satisfies Grade-II MORTH specification
9.5	485	8.7	8.66	91.34	90-100	
4.75	2965	52.9	61.61	38.39	35-51	
2.36	713	12.7	74.34	25.66	24-39	
1.18	468	8.4	82.70	17.30	15-30	
0.3	395	7.1	89.75	10.25	9-19	
0.075	316	5.6	95.39	4.61	3-8	

Total Weight of Sample: **5550** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
13.2	0	0.0	0	100	100	Gradation satisfies Grade-II MORTH specification
9.5	475	8.6	8.56	91.44	90-100	
4.75	2852	51.4	59.95	40.05	35-51	
2.36	765	13.8	73.73	26.27	24-39	
1.18	425	7.7	81.39	18.61	15-30	
0.3	432	7.8	89.17	10.83	9-19	
0.075	325	5.9	95.03	4.97	3-8	

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